

# History of Depleted Uranium Research at AFRRI

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## ***History of AFRRI Embedded Fragment Research***

- Concern by wounded Gulf War veterans and medical personnel about health effects from embedded DU shrapnel (1991-92)
- Request from US Army Surgeon General for literature assessment of health risks from DU fragments (Feb 92)
- Provisional AFRRI recommendations (Mar 93)
  - No evidence that required changes in fragment removal policy
  - Suggested patient follow up and further research

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## ***AFRRI Technical Reports***

- **AFRRI TR 93-1:** Assessment of the Risks from Imbedded Fragments of Depleted Uranium (Eric G. Daxon and Jeffery H. Musk)
- **AFRRI TR 93-2:** Protocol for Monitoring Gulf War Veterans with Imbedded Fragments of Depleted Uranium (Eric G. Daxon)
- **AFRRI TR 93-3:** Depleted Uranium: Questions and Answers (Eric E. Kearsley and Eric G. Daxon)

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## ***AFRRI DU Research Mission***

*Are existing fragment removal guidelines  
appropriate for a metal with the unique  
chemical and radiological properties of DU?*

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# ***History of AFRRI Embedded Fragment Research***

- Pilot study for adequacy of rat model for studies of embedded DU (PM TMAS funding, Apr 94)  
AFRRI TR 96-3: Establishment of an Animal Model to Evaluate the Biological Effects of Intramuscularly Embedded Depleted Uranium Fragments.
- Study of redistribution and toxicity of embedded DU fragments (USAMRMC grant, Jan 95-Jan 99)  
First demonstration that DU fragments rapidly degrade after implantation.

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# ***History of AFRRI Embedded Fragment Research***

- AFRRI Workshop: 15 November 1996

*Health Effects of Embedded Depleted Uranium Fragments*  
**AFRRI Special Publication 98-3** (David R. Livengood)

This workshop brought together researchers from AFRRI, Lovelace Respiratory Research Institute (Inhalation Toxicology Research Institute), Baltimore VA Medical Center/University of Maryland, and McMaster University to discuss current investigations.



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## ***History of AFRRI Embedded Fragment Research***

- Embedded depleted uranium effects on the developing fetus (USAMRMC Women's Health Issues Program grant, Oct 97-Apr 01)
- Carcinogenicity and immunotoxicity of embedded DU and WA (USAMRMC grant, Nov 01-Nov 06)
- Preconceptional paternal exposure to embedded depleted uranium fragments: transmission of genetic damage to offspring (USAMRMC grant, Mar 04-Dec 05)
- Carcinogenicity of embedded tungsten alloys in the mouse (PRMRP grant, Feb 06-Feb 11)

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# ***History of AFRRRI Embedded Fragment Research***

- A number of projects investigating the effect of militarily-relevant metals, including DU, in a variety of model systems have recently funded.
  - Effect of militarily-relevant metals on muscle wound repair (USAMRMC Core Research Program, War Supplemental Funding)
  - Epigenetic mechanisms and internal contamination with militarily-relevant heavy metals *in vivo* (DMRDP)
  - Effect of militarily-relevant metals on macrophage function (DMRDP)
  - A field method to measure uranium in water (USU / HJF JOTT, Technology IP Development Award)

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# ***History of AFRRI Embedded Fragment Research***

- Over 45 peer-reviewed publications
- Multiple book chapters
- Book (Depleted uranium: properties, uses, and health consequences (Alexandra Miller, ed.))
- U.S. Patent #6,107,098 (John Kalinich)
- Representation on committees and input to organizations dealing with DU- and embedded fragment-related issues (DoD, DVA, WHO, NATO, etc)

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## ***Collaborators***

- Columbia University
- National Institutes of Health / National Cancer Institute
- University of Paris
- United Kingdom Medical Research Council
- French Institute of Nuclear Security
- Memorial Sloan Kettering Cancer Center
- New York University
- University of Maine
- Armed Forces Institute of Pathology
- Army Research Laboratory
- University of Maryland School of Medicine
- Baltimore Veterans Administration
- Uniformed Services University School of Medicine and  
Graduate School of Nursing

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# ***AFRRI***

***a***

***Center of Excellence***

***for***

***Embedded Fragment Research***

